



Year 3
Topic: Light and Shadow
Strand: Physics

What I should already know.

- Certain things produce **light**, usually by burning (e.g. the Sun) or **electricity** (e.g. street **lights**).
- Shiny materials do not make **light** but do reflect it.
- **Shadows** are caused when certain materials block **light**.

What will I know by the end of the unit?

What is a **light source**?

- **A light source is something that emits light by burning, electricity or chemical reactions.**
- Burning **light sources** include the Sun, flames from a fire and stars.
- **We must never look directly at the Sun as the light produced is very bright and can be harmful to our eyes. This is why we wear sunglasses.**
- **Electric lights** include lamps, car headlights and street **light**.
- **Lights that are caused by chemical reactions** are much less common. This happens when different chemicals react and **light** is a **product** of that reaction. Examples can include glow sticks and fire flies.



Why do we need **light**?

- We need **light** so that we are able to see in the **dark**.
- **This is because the dark is the absence of light.** The Sun and stars always give us **light** but we can only see the stars when it is **dark**. At night time we cannot see the Sun's **light** as the Earth turns and our part of the Earth is not lit up by the Sun at night.]
- When we are driving, we need car headlights or street **lights** to help us.
- If we are walking or out in the dark, we would need **torches** to help us see. You should not look directly into the **torch** as this is dangerous.



What are not **sources** of **light**?

- The Moon is not a **source** of **light** even though we can see it in the **dark**.
- This is because the Sun's **light reflects** on the **surface** of the Moon making it appear as though the Moon **emits light**. Shiny things are not **light sources** - they appear to be **sources** of **light** as they are **bright**.

How does **light** travel?

- **Light** travels in straight lines.
- When light is blocked by an **opaque** object, a **dark shadow** is formed.

Diagrams

How are **shadows** formed?



- When **light** is blocked by an **opaque** object, a **dark shadow** is formed. An **opaque** material blocks **light** so we can't see through it and shine a **light** through it.
- When **light** is shone onto a **transparent** object, the **light** travels through it, we can see through it and it makes a very faint **shadow**.
- When **light** is shone onto a **translucent** object, some of the **light** travels through it, we can see **bright light sources** through it and it makes a fairly **dark shadow**.
- The size of a **shadow** changes as the **light source** moves. The further away the **light source** is, the smaller the **shadow** is. The closer the **source** of the light, the bigger the shadow.



Investigate!

- Why do lights seem **brighter** in the **dark**?
- Explore which objects form shadows when light is shone on them.
- What happens to your shadow over the course of a day? Investigate shadow length and position
- What happens when light is **reflected** from different **surfaces**?
- How can we be seen safely in the dark?

Vocabulary

Angle	The direction from which you look at something.
Bright	A colour that is strong and noticeable, and not dark .
Chemical reactions	A process that involves changes in the structure of something.
Dark	The absence of light .
Dim	Light that is not bright .
Electricity	A form of energy that can be carried by wires and is used for heating and lighting, and to provide power for machines.
Emits	To emit a sound or light means to produce it.
Light	A brightness that lets you see things.
Opaque	If an object or substance is opaque , you cannot see through it.
Product	Something that is produced.
Reflects	Sent back from the surface and not pass through it.
Shadows	A dark shape on a surface that is made when something stands between a light and the surface .
Source	Where something comes from.
Sunglasses	Glasses with dark lenses which you wear to protect your eyes from bright sunlight.
Surface	The flat top part of something or the outside of it.
Torches	A small electric light which is powered by batteries and which you can carry.
Translucent	If a material is translucent , some light can pass through it.
Transparent	If an object or substance is transparent , you can see through it.